Economic Council
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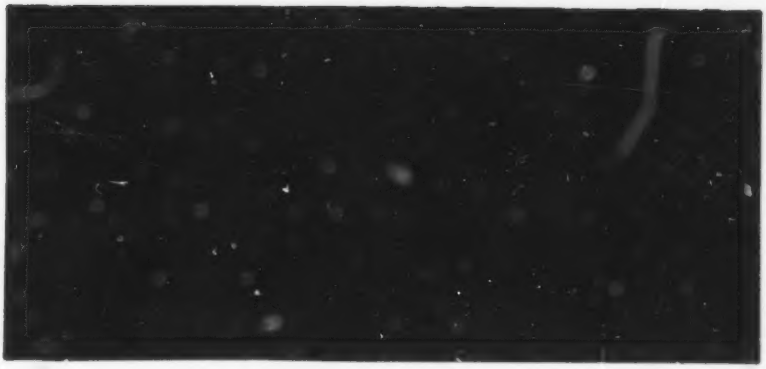
Conseil économique
du Canada

Working Paper
Document de travail



Working Paper No. 43

Canada's Trade Performance: World Market Shares and Comparative Advantages

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1992

ISSN 1180-3487

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The findings of this paper are the sole responsibility of the author.

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Contents

Abstract vii

Foreword ix

Acknowledgements xi

Introduction 1

Trends in the World Trade 2

Revealed Comparative Advantages 9
- Canada's Comparative Advantages 14
- International Comparison of Comparative Advantages 16
- Comparative Advantages in the High Technology Sector 20
- Structural Changes in Comparative Advantages 24

Analysis of Constant Market Shares 24

Conclusion 29

Appendices 33
- A – Standard International Trade Classification 34
- B – Countries or Groups of Countries Under Study 39

Notes 41

List of Figures and Tables 43

Bibliography 45

Abstract

This paper analyses Canada's trade performance in relation to that of other major industrialized countries over the last 20 years. World trade increased very rapidly during this period – a sign that economies are becoming more integrated in response to changing technology and business globalization, and to a more liberal trading environment. This trade globalization brings both new markets and new competitors; hence, it forces Canadian business to adjust.

Among major changes, a reduction of North America's importance in world trade and a sharp increase of Asia/Pacific countries' share can be noted. Simultaneously, a significant regionalization of trade into trading blocks also took place. The composition of trade also changed; manufactured goods now hold a major share of world trade while the share of resource-based products continue to decline.

Canada exports mainly to the United States; exports to Asia/Pacific countries are weak but increasing. Canada has, among G7 countries, the greatest reliance on resource-based exports. Most manufactured exports are limited to the American market. Canada is recognized on overseas markets mainly as an efficient producer of resource-based products.

An analysis of Canadian exports specialization indicates that Canada's comparative advantage is, for the most part, related to resource extraction and processing. By contrast, other industrialized countries and newly industrialized countries of Asia show a comparative advantage more anchored in the manufacturing sector; the difference is even more pronounced in the high technology sector. Moreover, Canada belongs to a group of countries showing little change in their comparative advantages over the last 20 years.

Canada's share of world exports dropped from 5.3 percent in 1971 to 4.0 percent in 1989. The shift in Canada's share was broken down into three factors: the composition of trade, its geographic distribution and the country's ability to compete in foreign markets.

Results show that product composition (i.e. the high concentration of resource-based products) had a negative impact on the variation of Canada's share of world exports. On the other hand, geographic distribution had a positive impact because of the relatively high weight and strong growth of the American market during the 1980s. The loss of market share results largely from a deterioration of its ability to compete. The size of Canada's loss in this regard is more significant than that of other major industrialized countries and this would suggest that internal factors eroded Canada's cost position. This finding is unequivocally demonstrated by studies on Canada's productivity and costs carried out during this

project.

To conclude, we observe that certain factors raise serious concerns as to the future of foreign trade and of the growth of Canadians' living standards. A low rate of change in Canadian exports specialization is not in itself a source of concern if it promises high and increasing living standards. In fact, Canada has achieved its high level of prosperity by reliance on the extraction and processing of its resources.

However, world trade developments and the issues of Canadian productivity and costs point to distressing signs. Specifically, the structure of Canadian exports is essentially dominated by products 1) that are relatively less important in world trade, 2) the relative prices of which have decreased, 3) for which Canada's productivity increases very slowly and 4) for which environmental problems are likely to worsen.

These factors increase the pressure on Canadian natural resources industries to increase their productivity at the extraction, processing and manufacturing levels. Moreover, new areas of specialization must be developed.

Foreword

In its statement entitled Pulling Together, the Council noted that competitiveness is a multidimensional concept that reflects the general health of an economy. National competitiveness is therefore defined by reference to broad indicators that show the extent to which a country's involvement in global markets through trade, investment, and technology flows leads to growth in real incomes. The crucial link between these activities and the growth of incomes is productivity. The specialization resulting from international competition increases productivity and, consequently, the incomes of Canadians by allowing a more efficient allocation of labour, capital and raw materials as well as achieving economies of scale.

Because of a relatively small domestic market, Canada's continued access to world markets and the ability to compete in terms of price, quality, service and new products is vital to maintain and to improve standards of living. During the last decade, it is worth remembering that, on average, over one quarter of the value of goods and services produced by the country was intended for foreign markets; this is almost twice as much as the average for major industrialized countries.

This document focuses on Canada's trade performance over the last twenty years relative to trends in world trade, with emphasis on major industrialized countries' trading patterns. The review of Canada's trade performance raises concerns as to the future of its external trade and living standards.

We find that Canada has a special place on the world trade scene by virtue of the fact that it has the highest concentration of resource-based exports among major industrialized countries. These products have generally grown at a slower pace than world merchandise export averages during the same period. This Canadian specialisation has changed little during this time. Other major industrialized countries have an export structure more in line with world trading patterns and trends.

One should not be overly surprised by a certain amount of stagnation in our international specialization since Canada has achieved its prosperity thanks largely to natural resources development and processing. However, we have good reasons to believe that, as world trade continues to change, Canada could find it difficult to sustain and improve its present relatively high living standards if it maintains its current dependence on natural resources. At least, some significant improvements in the performance of the resource sector will be necessary.

In addition, new areas of specialization need to be developed. With skills and technology becoming increasingly important in production, the need for a dynamic and evolving comparative advantage is a real imperative.

Judith Maxwell
Chairman

Acknowledgements

We wish to thank Sunder Magun, Harvey Lazar and two anonymous readers for their comments. In addition, we thank Clyde Drodge, Luc Filion and Diane Mantil for their technical support. Finally, we thank Danielle Wright for formatting the text. The author remains solely responsible for the text as written.

Introduction

This study is part of a project on Canadian competitiveness and trade performance.[1] This text analyses specifically Canada's trade performance in relation to that of other major industrialized countries, i.e. the United States, Japan, West Germany, France, the United Kingdom, and Italy.

Because Canada's domestic market is relatively small, its performance on foreign markets is paramount in determining living standards of Canadians. On average over the 1980s, more than one fourth of the value of goods and services produced nationally were exported. This is nearly double the average for major industrialized countries.

The specialization resulting from international competition increases productivity and, consequently, the incomes of Canadians by allowing a more efficient allocation of labour, capital and raw materials as well as achieving economies of scale. Moreover, international competition and the resulting competitive pressures also have a positive impact on productivity and real incomes by fostering rationalization, the use of improved management techniques and the adoption of state-of-the-art technologies. Thus, it is imperative to maintain access to world markets and the ability to compete in terms of price, quality, service, and new products to maintain and improve standards of living.

The scope of this study is defined in the context of a descriptive statistical analysis. The objective is to present the facts in a concise and orderly manner in order to highlight the main factors in Canada's changing trade performance. We do not deal here with the great theoretical debates on the fundamental determining factors of international trade; this has been done elsewhere in our project.[2]

We have used Statistics Canada's World Trade Database. The advantage of this database is that special efforts have been made to ensure that data complies with a standard classification system allowing accurate comparisons between countries and products.

In the following section, we summarize the major trends in international trade over the last 20 years and analyze the export structure of major industrialized countries in relation to that of Canada. We then analyze the "revealed" comparative advantage for major industrialized countries. This methodology allows us to identify, based on existing trade, those products for which each country has a specialization or comparative advantage. In the fourth section, we show an analysis of constant market shares to determine the origin of changes in national shares of world trade over the period 1971-89. Finally, we draw the main conclusions of our study and their implications for the future growth of Canadians' living standards.

Trends in World Trade

The phenomenal growth of external trade during the post-war period is a generally recognized fact. The volume of exports increased much more rapidly than production. This sharp increase of world trade is generally ascribed to the interaction of three major forces: the technological revolution, the increasing globalization of business and trade liberalization.

The speed and dependability of communications and transportation systems reflect technological developments. The increasingly significant role played by multinationals, the rise of all types of international business cooperation (joint ventures, strategic alliances, technological agreements, marketing agreements) and the globalization of key sectors of the financial system point to increasing internationalization of business. The success of multilateral negotiations under GATT and the growing trend towards regional agreements – such as the expansion of the European Community, the Canada-United States Free Trade Agreement and talks now underway between Canada, the United States and Mexico – are signs of a definite trend towards world trade liberalization.

In 1989, world merchandise trade amounted to 3,100 billion US dollars, almost ten times the 1971 amount of 362 billion dollars. Table 1 shows a summary of major trends in world exports over the period. These trends will serve as background for the discussion on Canada's trade performance. To place the discussion in a global perspective, regional values are expressed in world trade shares.

The data was retrieved from the World Trade Database (WTDB) maintained by Statistics Canada. This database starts with annual data on imports and exports provided by UN member states. Statistics Canada then makes adjustments to allow valid comparisons between countries and products.[3]

The WTDB contains information on trade flows for over 600 products and 170 countries. Trade flows are reported in current value and expressed in US dollars. Data on volumes are not available because commodity prices are not reported in a consistent manner. The scope of our analysis, i.e. the period 1971-89, is dictated by the availability of WTDB data.[4] To bring this database to more manageable proportions, we have used an aggregate of 63 products based on the Standard International Trade Classification (SITC).[5]

Table 1 is informative in several ways. First, it will be noted that the North American share of world exports decreased between 1971 and 1989, from 18.9 percent to 17.2 percent. Obviously, this downturn does not imply that North American exports have decreased; on the contrary, their share of regional production (GDP) increased from 5 to 9 percent over the period.

Rather, this decrease results from the fact that Asia/Pacific exports[6] have

Table 1

World exports: major trading blocks

(Per cent)

	Share of world trade				
	North America	EEC	Asia Pacific	Other countries	World
North America					
1971	7.6	4.3	2.7	4.3	18.9
1981	6.2	3.7	3.3	4.4	17.6
1989	7.0	3.4	4.2	2.6	17.2
EEC					
1971	3.9	20.4	1.8	11.9	38.0
1981	2.7	16.8	1.4	11.3	32.2
1989	3.4	22.1	2.3	9.6	37.3
Asia Pacific					
1971	3.8	1.8	4.3	2.7	12.6
1981	4.2	2.2	6.3	4.0	16.7
1989	7.2	3.3	9.5	3.4	23.4
Other Countries					
1971	3.1	11.2	2.4	13.6	30.3
1981	4.2	10.9	4.3	14.1	33.5
1989	3.2	7.7	2.7	8.5	22.1
World					
1971	18.4	37.8	11.3	32.5	100.0
1981	17.3	33.6	15.3	33.8	100.0
1989	20.9	36.5	18.6	24.0	100.0

increased significantly. Their share of world exports jumped from 12.6 percent in 1971 to 23.4 percent in 1989. Exports from this region to industrialized countries, particularly North America, increased substantially. In 1989, over one third of North American imports originated in the Asia/Pacific region compared with one fifth in 1971.

Following slippage during the 1970s, European Economic Community (EEC) countries have regained, during the last few years, the share of world exports they held in 1971, i.e. about 38 percent.

Other countries, mainly developing countries and those of Eastern Europe, increased their market share during the 70s and then suffered a decline during the 80s as a result of a sharp decrease in the world market price of commodities[7] and financial problems caused by indebtedness.

Table 1 also reveals another significant phenomenon, increased regionalization of world trade: exports inside trading blocks have increased more rapidly that intergroup exports. This phenomenon is also reflected in Figure 1. While strengthening of trading blocks was widespread, it was more pronounced in Asia/Pacific countries where intra-regional exports rose from 34 to 41 percent between 1971 and 1989. This sharp increase is due primarily to the fact that newly industrialized economies of this region intensified production of parts and finished products for Japanese companies and other countries of the region.[8]

The integration of national economies was also pronounced in the European Community where the proportion of intra-regional exports rose from 54 percent to 59 percent of total exports. In North America, the proportion of regional exports as a percentage of total exports remained about the same, (i.e. around 40 percent).

Market integration was already quite advanced between Canada and the United States and this proportion should increase with the opening of the Mexican economy.

In summary, Table 1 highlights the emergence of Asia/Pacific countries as a major trading block alongside the EEC and North America. In 1989, these three regions accounted for over three quarters of world merchandise trade. The domination of these three regions in world trade results both from the general progression of their exports on foreign markets and the strengthening of trade inside these large trading blocks, thus reflecting the growing integration of national economies inside these blocks.

Table 2 shows world trade market share changes for major countries. In the case of G7 countries, Japan and Italy had increases between 1971 and 1989 while Canada, the United States, the United Kingdom, West Germany and France had decreases in their respective shares of world trade during the same period. The sharp rise of Asia/Pacific countries' share of world trade is largely attributable to the remarkable performance of newly industrialized countries of Asia.

The value of Canadian exports amounted, in 1989, to about 4 percent of world trade, the lowest share among G7 countries. However, the Canadian share is higher than those of Sweden, Australia and New Zealand, countries with populations and resources more comparable to Canada.

As previously stated, a decrease in world market share does not mean that there has been a decrease in exports; it means that exports increased at a slower pace than world trade. Changes in world trade, as we have seen in the previous table, have been significantly influenced by the massive entry of newly industrialized countries in the ranks of major exporters. Several industrialized countries as well as Sweden, Australia and New Zealand, smaller economies based on resources like Canada, have also suffered decreases in their shares of world markets.

Figure 1

Intraregional trade, 1971 and 1989

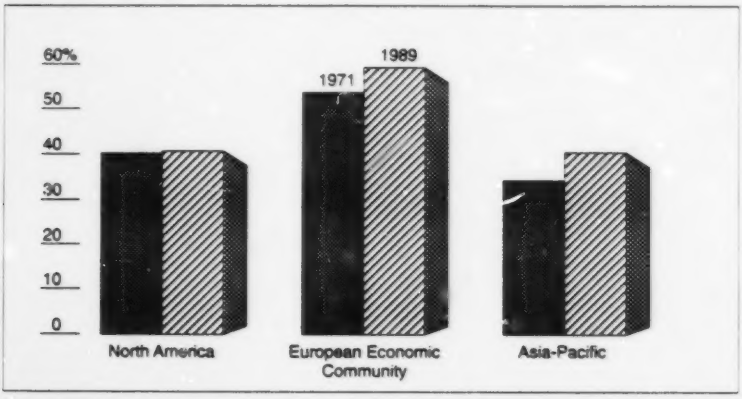


Table 2

World trade market share, some countries or groups of countries

(Per cent)

	1971	1975	1981	1985	1988	1989
Canada	5.28	3.79	3.79	4.70	4.32	3.97
United States	13.27	12.64	12.78	11.50	12.35	12.43
Japan	6.72	6.39	7.65	8.96	8.26	8.87
West Germany	11.15	10.26	8.83	9.36	11.47	10.80
France	5.79	5.83	5.10	4.97	5.74	5.76
United Kingdom	6.34	4.95	5.47	5.47	5.71	5.30
Italy	4.28	3.94	3.77	4.01	4.55	4.69
Other EEC	10.49	10.19	8.99	9.53	10.50	10.75
Sweden	2.18	2.02	1.43	1.55	1.77	1.72
EFTA	4.02	3.90	3.85	4.00	4.42	4.59
Asia NIC	2.12	2.48	4.28	5.76	9.44	8.01
Australia/ New Zealand	1.81	1.61	1.36	1.41	1.49	1.47
Other Countries	26.56	31.99	32.71	28.80	19.98	21.66
G7	52.82	47.80	47.39	48.97	52.41	51.81

Table 3 shows changes in world trade according to the single digit SITC and a four products grouping: food and live animals, other crude materials, fuels and manufactured products. The WTDB uses the Standard International Trade Classification (SITC) which is based on the level of processing and thus allows differentiating

Table 3

World trade market shares by SITC level

(Per cent)

SITC		1971	1975	1981	1985	1988	1989
0	Food and live animals	11.06	10.71	9.01	7.74	7.79	7.04
1	Beverages and tobacco	1.26	1.01	0.93	0.92	0.98	0.98
2	Crude materials, inedible, except fuels	8.52	6.80	5.76	5.33	5.51	5.07
3	Mineral fuels	9.67	17.75	21.38	16.57	7.29	8.01
4	Animal and vegetable oils, fats and waxes	0.76	0.66	0.52	0.63	0.41	0.31
5	Chemicals and related products	6.83	6.87	6.99	7.67	8.78	8.03
6	Manufactured goods classified chiefly by material	19.02	16.91	14.81	14.35	16.46	15.56
7	Machinery and transport equipment	27.34	26.31	26.19	30.16	34.26	32.72
8	Miscellaneous manufactured articles	8.36	7.49	8.32	9.72	12.38	11.96
9	Commodities and transactions not classified elsewhere in SITC	7.17	5.47	6.10	6.92	6.15	10.31
	Total	100.00	100.00	100.00	100.00	100.00	100.00
Food and live animals		12.32	11.72	9.93	8.66	8.77	8.03
Other crude materials		9.27	7.47	6.27	5.96	7.92	5.38
Fuels		9.67	17.75	21.38	16.57	7.29	8.01
Manufactured products		61.56	57.59	56.31	61.90	71.87	68.27
Commodities and transactions not classified elsewhere in SITC		7.17	5.47	6.10	6.92	6.15	10.31
	Total	100.00	100.00	100.00	100.00	100.00	100.00

between crude materials and manufactured goods. The share of manufactured goods in international trade increased during the 1980s. In 1989, they totalled about 70 percent of world exports while fuels amounted to 8 percent. The share of food and live animals as well as other crude materials totalled 8 and 5 percent respectively.

This increase in manufactured goods during the 80s is a marked departure from the previous decade profile during which manufactured goods decreased and fuels increased. The share of the other two major categories, i.e. food and live animals as well as other crude materials,have had an almost uninterrupted decline since 1971. Moreover, within the manufactured goods sector, the increase in exports of goods derived directly from resources (SITC 5 and 6) was weaker as shown by the decrease in their share of manufactured goods exports from 42 percent in 1971 to 35 percent in 1989.

The following two tables examine the structure of exports for each of the G7 countries, at the level of both geographic distribution and product composition. As far as exports destinations are concerned, Table 4 highlights the large concentration of Canadian exports to the United States. This proportion rose from 69 percent in 1971 to 74 percent in 1989.[9] Trade with Japan and Pacific Rim countries[10] (PRC) increased while the share of exports to major European countries has declined.

Except for the United States, other G7 countries trade very little with Canada. United States exports are distributed in almost similar fashion between G4 countries,[11] Japan and Pacific Rim countries. Major European countries export mainly to each other;[12] the sharp increase in the United Kingdom's share of exports to G4 countries can be explained by its adherence to the EEC. Japan exports mainly to the United States and other Pacific Rim countries while its share of exports to major European countries is on the rise.

Table 5 breaks down G7 exports into four types of goods: food and live animals, other crude materials, fuels and manufactured goods. Canada is the country whose proportion of manufactured goods, 64 percent in 1989, was the lowest of the group. Exports from other G7 countries consist almost entirely of manufactured goods: the proportion of manufactured goods is 97 percent for Japan, 90 percent for West Germany,[13] 90 percent for Italy, 84 percent for the United Kingdom, 78 percent for France and 70 percent for the United States.

The higher concentration of raw materials for Canadian exports can be explained by the relative abundance of natural resources. It should be noted, however, that the proportion of manufactured goods increased during the period. This increase is distributed in both automotive products and other manufactured goods. The fact that the importance of the manufacturing sector increased suggests that Canada is, in some way, adapting to trends in world trade and that the disindustrialization process is not reflected in Canadian foreign trade.

Table 4

Geographic distribution of exports G7

(Per cent)

	Share of national exports						
	Canada	US	G4	Japan	PRC	Other countries	World
Canada							
1971	–	68.5	12.1	4.6	1.9	12.9	100.0
1981	–	65.6	8.7	5.6	3.0	17.0	100.0
1989	–	73.7	6.1	6.5	4.4	9.3	100.0
United States							
1971	23.5	–	18.2	9.5	5.4	43.3	100.0
1981	17.6	–	16.2	9.4	10.5	46.3	100.0
1989	23.4	–	16.1	12.1	14.8	33.6	100.0
Japan							
1971	3.5	32.1	7.2	–	22.6	34.5	100.0
1981	2.2	25.7	9.3	–	24.5	38.3	100.0
1989	2.7	34.5	13.2	–	28.3	21.3	100.0
France							
1971	1.1	5.3	37.8	0.8	1.5	53.5	100.0
1981	0.7	5.7	34.5	1.0	2.2	55.8	100.0
1989	1.0	6.8	38.6	2.0	3.8	47.9	100.0
West Germany							
1971	1.1	9.4	24.7	1.4	2.1	61.4	100.0
1981	0.7	6.4	27.1	1.2	2.6	61.9	100.0
1989	0.9	7.8	30.9	2.7	2.1	55.5	100.0
Italy							
1971	1.1	9.7	41.5	0.8	1.5	45.4	100.0
1981	0.7	6.8	35.8	0.9	2.0	53.6	100.0
1989	1.1	8.7	41.2	2.4	4.0	42.7	100.0
United Kingdom							
1971	3.6	11.6	12.5	1.7	4.2	66.3	100.0
1981	1.7	12.1	21.9	1.4	3.7	59.1	100.0
1989	2.7	12.8	26.2	2.4	4.5	51.5	100.0

The overwhelming domination of the American market in Canadian exports exists for all categories, as is shown by Table 6, but particularly for manufactured goods and fuels. About 85 percent of all manufactured Canadian exports are shipped to the United States. According to our estimates, foreign controlled

multinationals are responsible for 75 percent of manufacturing exports.

Moreover, in the automotive products sector which was responsible for 40 percent of all manufactured goods exports to the United States in 1989, trade is regulated under the Auto Pact. Thus, this is a highly regionalized trade which does not react solely to market forces. In the case of primary products, fuels excepted, geographic distribution is more even between the United States and overseas countries.

Thus, Canada appears to be known on overseas markets as an efficient producer of primary products while its presence in the manufactured products trade is limited essentially to the American market. However, the proportion, small as it is, of manufacturing exports to Asia/Pacific countries in increasing steadily.

In summary, the foregoing analysis identified two important issues in Canada's trade performance in relation to world trade trends over the last twenty years. First, Canada's share of world trade has decreased. This phenomenon is also present in most major industrialized countries and is in part related to newly industrialized countries joining the ranks of major exporters. Second, it has also been noted that world exports of manufactured goods have increased more rapidly that exports of crude materials. Canada has, among major industrialized countries, the lowest proportion of manufactured goods exports. Moreover, Canadian exports, particularly manufactured goods exports, are heavily concentrated on the American market.

Revealed Comparative Advantages

International trade enables each country to specialize and export the goods and services it produces at a relatively low cost and to import those it produces at a relatively high cost. This specialization increases productivity and real incomes by promoting a more efficient allocation of labour, capital and natural resources as well as the achievement of economies of scale. This capacity of an economy to produce certain goods relatively more efficiently than another economy, or its comparative advantage, depends on the availability of resources, technology and on the economic structure of a country.

The concept of comparative advantage raises measurement problems since it relies on prices in autarky, i.e. prior to trade taking place. Since it is impossible to identify the "real" comparative advantages because these prices are not observable, one must therefore rely on empirical international trade data. This indirect way of measuring comparative advantages is based on the principle that performance on international markets, given the strong prevailing competition, will reveal that range of goods for which each country has a comparative advantage.

Table 5

Composition of G7 national exports

(Per cent)

	1971	1975	1981	1985	1988	1989
Canada						
Food and live animals	11.78	12.42	11.31	8.13	8.51	7.17
Other crude materials	21.61	19.13	17.54	13.72	15.32	15.85
Fuels	7.15	16.54	14.20	13.99	9.01	9.17
Manufactured goods	59.08	51.60	53.69	61.64	63.61	64.09
(autos)	21.92	17.77	15.75	26.74	29.65	27.66
NES	0.38	0.31	3.26	2.52	3.55	3.72
Total	100.00	100.00	100.00	100.00	100.00	100.00
United States						
Food and live animals	11.61	15.81	14.32	10.52	9.78	9.86
Other crude materials	11.28	10.11	9.82	8.73	8.61	7.87
Fuels	4.19	4.24	4.44	4.72	2.58	2.76
Manufactured goods	69.46	66.90	67.79	70.79	70.28	70.32
NES	3.46	2.93	3.64	5.24	8.74	9.18
Total	100.00	100.00	100.00	100.00	100.00	100.00
Japan						
Food and live animals	2.81	1.36	1.14	0.75	0.62	0.60
Other crude materials	1.85	1.56	1.05	0.84	0.76	0.75
Fuels	0.27	0.40	0.36	0.32	0.24	0.38
Manufactured goods	94.28	95.36	96.52	97.09	97.00	96.83
NES	0.80	1.32	0.93	1.01	1.37	1.44
Total	100.00	100.00	100.00	100.00	100.00	100.00

France						
Food and live animals	16.91	15.02	16.31	15.27	15.31	15.21
Other crude materials	4.74	4.27	3.93	4.63	4.35	4.10
Fuels	2.25	2.78	4.75	3.96	2.07	2.22
Manufactured goods	75.20	77.15	74.30	75.44	77.90	77.92
NES	0.91	0.77	0.71	0.70	0.36	0.56
Total	100.00	100.00	100.00	100.00	100.00	100.00
West Germany						
Food and live animals	3.23	4.04	5.34	4.67	4.72	4.01
Other crude materials	2.61	2.67	2.51	2.55	2.09	2.07
Fuels	3.00	3.14	4.09	2.85	1.30	1.10
Manufactured goods	89.61	88.49	85.72	87.84	90.58	77.57
NES	1.55	1.66	2.34	2.10	1.32	15.25
Total	100.00	100.00	100.00	100.00	100.00	100.00
Italy						
Food and live animals	8.50	8.15	7.19	7.06	6.24	5.95
Other crude materials	2.36	1.93	2.27	2.07	1.98	1.92
Fuels	5.45	5.86	6.37	4.68	1.68	1.73
Manufactured goods	83.43	83.61	84.03	85.80	90.01	90.06
NES	0.26	0.45	0.13	0.38	0.09	0.33
Total	100.00	100.00	100.00	100.00	100.00	100.00
United Kingdom						
Food and live animals	6.38	7.18	6.82	5.96	6.20	6.72
Other crude materials	2.91	2.73	2.46	2.62	2.40	2.37
Fuels	2.60	4.17	17.73	19.98	6.40	5.95
Manufactured goods	85.32	83.43	69.83	69.21	82.84	83.82
NES	2.78	2.49	3.15	2.23	2.15	1.14
Total	100.00	100.00	100.00	100.00	100.00	100.00

Table 6

Distribution of Canadian exports by product and destination

(Per cent)

	1971	1975	1981	1985	1989
United States					
Food products	31.4	22.7	24.3	38.8	44.2
Other crude materials	49.3	45.3	43.3	48.6	43.0
Fuels	94.9	88.6	87.6	87.2	81.9
Manufactured goods	79.6	76.0	74.6	87.5	84.5
G4					
Food products	20.9	16.3	12.9	6.9	6.6
Other crude materials	21.7	22.5	19.6	15.1	17.2
Fuels	0.4	0.7	1.1	0.7	0.8
Manufactured goods	8.3	7.5	6.2	2.9	4.2
Japan					
Food products	8.6	13.7	11.6	11.1	14.7
Other crude materials	12.5	15.5	14.5	14.0	18.9
Fuels	4.3	8.9	6.6	8.9	12.0
Manufactured goods	1.0	0.8	1.4	1.2	1.6
Asia/Pacific (minus Japan)					
Food products	10.4	9.2	8.5	6.7	7.2
Other crude materials	1.0	1.4	4.0	5.5	5.9
Fuels	–	–	1.2	1.9	3.1
Manufactured goods	0.9	1.7	2.2	2.2	3.2
Other Countries					
Food products	28.7	38.0	42.7	36.5	27.3
Other crude materials	15.6	15.3	18.6	16.8	15.0
Fuels	0.3	1.8	3.4	1.3	2.3
Manufactured goods	10.2	13.9	15.5	6.2	6.5
Total					
Food products	100.0	100.0	100.0	100.0	100.0
Other crude materials	100.0	100.0	100.0	100.0	100.0
Fuels	100.0	100.0	100.0	100.0	100.0
Manufactured goods	100.0	100.0	100.0	100.0	100.0

We use the Balassa indicator based on exports to measure the Revealed Comparative Advantage (RCA). This indicator is defined as the ratio of a country's share of world exports of a particular product to that same country's share of total world merchandise exports. A product is deemed to have a comparative advantage when this ratio is higher than 1.

$$(1)\ RCA = \frac{\frac{X_{ci}}{X_{wi}}}{\frac{X_{ctot}}{X_{wtot}}}$$

Where:

X_{ci}	=	national exports of product i
X_{wi}	=	world exports of product i
X_{ctot}	=	total exports of the country
X_{wtot}	=	world exports

There is no ideal measurement of revealed comparative advantages. While it is generally recognized that an indicator based on net exports is theoretically better than one based solely on exports,[14] such a measure encounters more acute empirical problems. First, a measure based on net exports is sensitive to trade balance fluctuations due to economic conditions. This sensitivity to cyclical variations can make international and time comparisons misleading since the comparative advantage concept is aimed mostly at determining the long term specialization of an economy. Secondly, while the two measures are influenced by export assistance, the measure of net exports is also influenced by specific domestic policies aimed at controlling certain imports.

Our selection of an indicator based only on exports rests on a preliminary analysis which includes also indicators based on net exports. Generally, overall results are similar. In cases where the two types of indicators differ, those based on net exports appear very sensitive to protectionist policies as indicated by Balassa.[15]

For instance, in Canada's case, goods classified as having a comparative advantage under the net export method but not according to exports are almost entirely related to the agricultural sector. This advantage results from the fact that the low proportion of imports is attributable to the high degree of protection afforded to this sector. The case of Japan, known for high protectionism, is also instructive on this question. It has, among major industrialized countries, the lowest manufacturing imports share of its total imports. This situation is also reflected in indicators of comparative advantages. Japan is the country for which the number of manufactured goods classified as having a comparative advantage under the net exports method, but not under the exports method, is the highest.

To reduce the sensitivity of indicators to cyclical variations and given that it is difficult to find a "neutral" year, we have calculated the indicator on an average at the beginning of the period, i.e. 1971-73 and at the end, i.e. 1987-89.

a) Canada's Comparative Advantages

Canada's comparative advantages are shown in Table 7. They are concentrated mainly in the raw materials sector such as forestry and mining products, fuels and products of agriculture and fisheries. Manufacturing sector comparative advantages result from resource processing such as pulp and paper, wood products, non-ferrous metals, chemicals and fertilisers. In fact, excluding the automotive sector where the comparative advantage is related, in part at least, to the Auto Pact,[16] power generating machinery and equipment constitutes the only sector of activity where Canada enjoys comparative advantages not directly related to primary resources. This advantage is related to exports of turbine and jet engines and parts. The twenty or so products that enjoy a comparative advantage total about two-thirds of Canadian exports.

Table 7 also highlights the addition of new products to the group enjoying comparative advantages since 1971-73. These sectors, directly related to natural resources, are coal (SITC 32), animal oils and fats (41), hides, skins and furskins (21). Elsewhere, except for the beverages sector (11), Canada has maintained its comparative advantages. In addition to these changes, there has also been a significant strengthening of specialisation in the following sectors, all related to natural resources: corks and wood (24), pulp and waste paper (25) and electric current (35).

These gains must, however, be seen in the perspective of world trade developments. To illustrate this fact, one needs to slightly manipulate the RCA formula (equation 1) to obtain the following expression:

$$(2)\quad RCA = \frac{\dfrac{X_{ci}}{X_{ctot}}}{\dfrac{X_{wi}}{X_{wtot}}}$$

Thus, the Balassa index can also be defined as the ratio of the share of a particular product in national exports to the share of world exports of this product in total world exports. It then becomes evident that comparative advantages are created or maintained by the simple fact that the share of a product in world trade decreases, *ceteris paribus*.

Since Canada specializes in resource-based products whose share of total trade has decreased (Table 2), RCA gains could fail to reflect an increased specialization of Canadian exports. Except for electric current exports (35) where Canada made gains in an increasing world market, RCA gains are largely concentrated in sectors that have suffered from a decreasing world trade share: in other words, our presence is felt more strongly in sectors with a lower rate of growth.

Table 7

Canadian exports specialization by revealed comparative advantage

		Ratio	
		1971-1973	1987-1989
Products for which Canada had a comparative advantage in 1987-89			
SITC			
25	Pulp and waste paper	6.8	7.9
24	Cork and wood	3.8	5.2
35	Electric current	3.7	4.3
64	Paper, paperboard and articles of paper pulp	4.0	3.6
34	Gas, natural and manufactured	5.5	3.2
27	Crude fertilizers and crude minerals	2.8	3.0
28	Metalliferous ores and metal scrap	4.0	2.8
56	Fertilizers, manufactured	2.5	2.7
78	Road vehicles	2.7	2.7
32	Coal, coke and briquettes	0.8	2.5
4	Cereals and cereal preparations	2.3	2.5
68	Non-ferrous metals	2.5	2.0
3	Fish, crustaceans and molluscs	2.2	1.8
22	Oil seeds and oleaginous fruit	1.7	1.7
0	Live animals	1.0	1.5
63	Cork and wood manufactures	1.5	1.5
52	Inorganic chemicals	1.1	1.4
41	Animal oils and fats	0.9	1.4
71	Power generating machinery and equipment	1.8	1.3
21	Hides, skins and furskins, raw	0.8	1.1
11	Beverages	1.4	0.7
Products with the greatest comparative disadvantage from 1987 to 1989			
85	Footwear	0.1	0.1
83	Travel goods, handbags and similar containers	0.2	0.1
84	Articles of apparel and clothing accessories	0.2	0.1
43	Animal and vegetable oils and fats	0.1	0.1
53	Dyeing, tanning and colouring materials	0.1	0.2

The group of comparative advantages has also suffered some slippage. In addition to the above-mentioned beverages sector (11), the value of RCAs has decreased significantly in the following sectors: natural gas (34), metalliferous ores (28), power generating machinery and equipment (71), non-ferrous metals (68), paper and paperboard (64). Except for natural gas where the Canadian share

increase is lower than that of the world share,[17] the RCA decrease results either from a Canadian loss higher than the world loss (68, 28) or a Canadian loss in an increasing world market (71, 64). It should be noted that the main downturns are found largely in the manufactured goods sector (SITC 6, 7 and 8). These developments are therefore indicative of the weakness of some of Canada's RCAs.

The growth of Canadian manufactured goods exports other than resources has not been sufficient to create other comparative advantages. Indeed, except for automobiles and generating machinery for which Canada already enjoys a relative advantage, the average revealed comparative advantage for "machinery and transport equipment" and "miscellaneous manufactured articles" (SITC sectors 7 and 8) was 0.4 in 1987-89, the same level as in 1971-73.

Table 7 also groups the five goods which had the weakest RCAs in 1987-89 and thus are sectors with the highest "comparative disadvantage". It should be noted that three of these goods are related to labour-intensive products such as clothing, footwear and textile. These sectors were also at the bottom of the scale in 1971-73. This confirms a long recognized result to the effect that protecting declining sectors only serves to maintain a precarious situation, it does not create comparative advantages.

b) International comparison of comparative advantages

Table 8 shows the RCAs of major industrialized countries, i.e. members of the G7, Sweden, EFTA countries, Australia and New Zealand and, finally, newly industrialized countries of Asia (NIC). For simplicity's sake, we show indicators for the first 20 products ranked by order of comparative advantage.[18]

The first observation to be made from these tables is that, unlike Canada, other G7 members have a range of comparative advantages covering the whole of the manufacturing sector, i.e. products in codes 50 and up in the Standard International Trade Classification. The same applies for newly industrialized countries of Asia.

The concentration of Canada's RCAs in the resource sector makes it more comparable to Sweden, Australia and New Zealand. These countries are well endowed with natural resources even though Sweden appears to have a more diversified comparative advantages structure.

With respect to trends in other G7 comparative advantages, Japan's most noticeable gains are in the machinery and transport equipment sector. Japan seems intent on concentrating on this type of product since it suffered strong declines in other manufactured goods. In the United States, the machinery and transport equipment sector is losing ground; the automobile sector is in a state of comparative disadvantage. In Germany, the machinery and transport equipment

Table 8

Revealed comparative advantages, industrialized countries,[1] exports based index, 1971-73 and 1987-89

	Canada		United States		Japan		Germany	
	1971-73	1987-89	1971-73	1987-89	1971-73	1987-89	1971-73	1987-89
1.	25 (6.77)	25 (7.86)	22 (4.68)	22 (4.09)	76 (4.23)	76 (3.46)	73 (2.90)	53 (2.33)
2.	34 (5.54)	24 (5.21)	41 (3.84)	41 (3.59)	79 (3.18)	88 (3.03)	53 (2.88)	73 (1.96)
3.	64 (4.04)	35 (4.27)	4 (3.35)	12 (3.25)	67 (3.14)	78 (2.63)	32 (2.21)	72 (1.89)
4.	28 (4.02)	64 (3.57)	12 (2.80)	4 (2.88)	88 (2.36)	73 (2.22)	58 (2.21)	78 (1.83)
5.	24 (3.78)	34 (3.16)	75 (2.36)	79 (2.63)	89 (2.06)	75 (2.06)	72 (2.17)	74 (1.80)
6.	35 (3.66)	27 (3.03)	79 (2.32)	21 (2.19)	78 (1.86)	77 (1.98)	74 (2.06)	59 (1.75)
7.	27 (2.77)	28 (2.75)	32 (2.23)	87 (2.15)	65 (1.82)	67 (1.75)	82 (1.92)	58 (1.74)
8.	78 (2.74)	56 (2.69)	8 (2.06)	75 (2.09)	3 (1.79)	62 (1.60)	43 (1.91)	2 (1.70)
9.	68 (2.48)	78 (2.65)	87 (1.99)	32 (2.06)	83 (1.65)	74 (1.56)	78 (1.89)	69 (1.59)
10.	56 (2.46)	32 (2.48)	71 (1.97)	56 (1.96)	62 (1.63)	71 (1.50)	81 (1.87)	81 (1.57)
11.	4 (2.32)	4 (2.47)	51 (1.52)	8 (1.93)	69 (1.58)	72 (1.42)	59 (1.87)	87 (1.51)
12.	3 (2.23)	68 (2.03)	74 (1.46)	25 (1.92)	75 (1.47)	87 (1.35)	51 (1.84)	82 (1.44)
13.	71 (1.78)	3 (1.84)	52 (1.45)	71 (1.86)	58 (1.39)	69 (0.87)	77 (1.73)	43 (1.42)
14.	22 (1.71)	22 (1.74)	59 (1.43)	24 (1.48)	77 (1.36)	51 (0.86)	87 (1.70)	51 (1.37)
15.	63 (1.51)	0 (1.54)	72 (1.42)	59 (1.40)	51 (1.30)	89 (0.77)	67 (1.55)	54 (1.34)
16.	11 (1.38)	63 (1.53)	9 (1.41)	52 (1.33)	87 (1.06)	58 (0.73)	69 (1.53)	55 (1.29)
17.	52 (1.07)	52 (1.40)	21 (1.40)	77 (1.31)	74 (1.04)	79 (0.72)	52 (1.50)	67 (1.26)
18.	0 (0.97)	41 (1.39)	77 (1.30)	26 (1.27)	71 (0.99)	65 (0.70)	54 (1.43)	62 (1.24)
19.	41 (0.86)	71 (1.33)	42 (1.22)	51 (1.27)	56 (0.97)	53 (0.70)	75 (1.40)	71 (1.18)
20.	21 (0.80)	21 (1.13)	88 (1.21)	54 (1.20)	73 (0.95)	59 (0.58)	88 (1.38)	64 (1.17)

Table 8 (cont.)

	France		United Kingdom		Italy		OEEC	
	1971-73	1987-89	1971-73	1987-89	1971-73	1987-89	1971-73	1987-89
1.	11 (4.73)	11 (5.89)	11 (3.63)	79 (3.41)	85 (8.03)	85 (4.87)	2 (3.53)	2 (3.89)
2.	55 (3.28)	35 (5.22)	66 (3.05)	11 (3.07)	83 (4.39)	82 (3.99)	29 (3.07)	9 (3.55)
3.	2 (2.82)	55 (3.97)	71 (2.61)	53 (2.19)	84 (3.07)	61 (3.88)	1 (3.04)	29 (3.53)
4.	62 (2.62)	0 (3.64)	59 (2.02)	55 (2.03)	81 (2.75)	81 (3.27)	34 (2.67)	1 (3.38)
5.	0 (2.12)	6 (2.91)	54 (1.97)	71 (1.96)	82 (2.41)	83 (2.50)	9 (2.41)	5 (2.35)
6.	4 (2.03)	4 (2.81)	55 (1.95)	54 (1.96)	5 (2.39)	84 (2.31)	43 (2.40)	0 (2.09)
7.	35 (1.96)	2 (2.67)	53 (1.90)	59 (1.95)	11 (2.31)	72 (2.14)	56 (2.37)	43 (2.03)
8.	61 (1.68)	22 (2.30)	72 (1.89)	87 (1.83)	62 (2.10)	74 (2.05)	82 (2.25)	42 (1.98)
9.	6 (1.65)	62 (2.21)	61 (1.72)	51 (1.66)	61 (2.00)	73 (1.95)	0 (2.05)	58 (1.97)
10.	67 (1.54)	52 (2.11)	62 (1.70)	52 (1.63)	73 (1.77)	69 (1.93)	5 (1.98)	66 (1.89)
11.	78 (1.51)	59 (1.68)	87 (1.64)	66 (1.55)	58 (1.73)	65 (1.90)	58 (1.84)	12 (1.64)
12.	84 (1.45)	54 (1.64)	75 (1.62)	75 (1.54)	89 (1.69)	66 (1.80)	42 (1.65)	11 (1.61)
13.	59 (1.42)	67 (1.54)	89 (1.54)	89 (1.52)	74 (1.69)	11 (1.80)	51 (1.64)	21 (1.57)
14.	81 (1.39)	51 (1.52)	21 (1.53)	12 (1.32)	65 (1.68)	5 (1.75)	67 (1.63)	51 (1.54)
15.	54 (1.36)	1 (1.48)	9 (1.50)	74 (1.29)	72 (1.62)	89 (1.65)	65 (1.62)	56 (1.50)
16.	77 (1.36)	58 (1.43)	69 (1.49)	0 (1.26)	77 (1.60)	62 (1.55)	81 (1.57)	54 (1.48)
17.	58 (1.35)	81 (1.40)	74 (1.47)	72 (1.21)	69 (1.45)	58 (1.22)	3 (1.51)	8 (1.47)
18.	85 (1.32)	79 (1.36)	88 (1.45)	62 (1.14)	66 (1.42)	67 (1.16)	59 (1.43)	6 (1.44)
19.	65 (1.32)	71 (1.32)	73 (1.40)	21 (1.13)	75 (1.41)	77 (0.99)	66 (1.39)	55 (1.43)
20.	75 (1.29)	78 (1.26)	78 (1.37)	88 (1.08)	54 (1.33)	42 (0.97)	11 (1.39)	59 (1.43)

Table 8 (cont.)

	Sweden		EFTA		AUS-NZ		ASIA-NICs	
	1971-73	1987-89	1971-73	1987-89	1971-73	1987-89	1971-73	1987-89
1.	25 (11.28)	25 (6.40)	35 (5.52)	64 (4.09)	1 (10.42)	32 (15.74)	84 (9.79)	83 (5.72)
2.	64 (5.12)	64 (6.12)	43 (4.67)	35 (4.07)	26 (9.92)	26 (15.44)	83 (8.41)	85 (4.35)
3.	24 (3.97)	24 (3.68)	64 (4.52)	54 (3.05)	21 (6.86)	1 (7.95)	63 (6.97)	84 (4.04)
4.	28 (3.33)	74 (2.14)	53 (4.30)	53 (2.98)	2 (6.80)	28 (7.78)	23 (6.69)	76 (2.89)
5.	35 (3.02)	82 (2.11)	88 (4.14)	73 (2.58)	28 (5.07)	21 (7.06)	85 (4.19)	65 (2.39)
6.	81 (2.82)	63 (1.98)	25 (3.35)	34 (2.34)	32 (4.88)	2 (4.93)	89 (3.53)	89 (2.36)
7.	76 (2.05)	67 (1.98)	54 (2.99)	88 (2.25)	41 (4.83)	41 (4.86)	76 (3.27)	77 (1.91)
8.	82 (2.03)	54 (1.78)	3 (2.77)	25 (2.19)	6 (3.94)	4 (3.62)	65 (2.66)	75 (1.85)
9.	79 (1.96)	69 (1.75)	63 (2.42)	68 (2.15)	52 (2.43)	6 (3.56)	3 (2.60)	3 (1.82)
10.	74 (1.93)	81 (1.74)	24 (2.16)	63 (2.06)	4 (2.41)	68 (3.51)	29 (2.11)	81 (1.79)
11.	63 (1.71)	78 (1.59)	73 (2.13)	72 (1.92)	68 (1.67)	0 (2.77)	81 (1.77)	88 (1.78)
12.	67 (1.63)	35 (1.54)	9 (1.83)	24 (1.83)	3 (1.49)	3 (2.15)	5 (1.59)	43 (1.63)
13.	69 (1.55)	72 (1.48)	68 (1.83)	3 (1.83)	29 (1.48)	5 (1.62)	77 (1.42)	69 (1.48)
14.	75 (1.44)	87 (1.31)	55 (1.75)	21 (1.63)	5 (1.09)	29 (1.39)	88 (1.41)	82 (1.31)
15.	78 (1.31)	76 (1.30)	51 (1.70)	69 (1.63)	59 (0.98)	61 (1.27)	42 (1.18)	61 (1.31)
16.	71 (1.27)	71 (1.30)	87 (1.68)	87 (1.52)	0 (0.81)	27 (1.07)	82 (1.18)	29 (1.29)
17.	72 (1.25)	21 (1.27)	56 (1.67)	81 (1.48)	63 (0.70)	24 (1.05)	9 (1.17)	23 (1.28)
18.	62 (1.20)	43 (1.23)	72 (1.64)	51 (1.47)	79 (0.61)	8 (1.01)	66 (1.09)	63 (1.28)
19.	73 (1.16)	28 (1.12)	89 (1.56)	55 (1.46)	34 (0.57)	25 (0.95)	6 (0.93)	62 (0.99)
20.	43 (1.08)	73 (1.03)	2 (1.48)	66 (1.46)	8 (0.53)	59 (0.82)	69 (0.85)	12 (0.85)

1 The first column identifies the product under the SITC classification reproduced in Appendix A. The number between parentheses is the Balassa index based on exports.

sector is also slipping.

Italy has made varied gains and losses in the miscellaneous manufactured articles sector without changing significantly the group of comparative advantages. The United Kingdom has suffered losses in the manufacturing sector, in general, but enjoyed gains in transport equipment other than road vehicles, in petroleum, chemical products and live animals.

France has undergone major changes. It enjoyed important gains in agricultural products, chemicals and related products as well as in electricity. On the other hand, it lost RCAs in some types of machinery, clothing and footwear. Newly industrialized countries of Asia have significantly improved their position in manufactured goods in general. On the other hand, they reduced their concentration in the clothing, cork and wood products and crude rubber sectors.

c) Comparative advantages in the high technology sector

The development of high technology industries is important to the extent that they have a high value added content and allow for a revitalization of the manufacturing process. However, the concept of high technology is difficult to delineate. It may be defined using the goods produced by some industries such as informatics, nuclear energy, biotechnology and telecommunications. It may also be defined by the intensity of research and development. The following analysis rest on this last concept. This definition is widely used by OECD and EEC researchers. The list and description of so-called high technology products in SITC is shown in Table 9. These products are almost all found in groups seven and eight of the SITC.

Exports of these products have not only had a higher growth than world trade but even stronger than for manufactured goods as their share of manufactured goods grew from 15 percent in 1971-73 to 22 percent in 1987-89. As a result, these sectors generate a special interest in trade performance analysis.[19]

Table 9 shows also a comparison of Canada's RCAs in this sector between 1971-73 and 1987-98. Canada's presence in this strategic sector is not only very slight from the start, it decreases over time. Canada's advantages are limited to radioactive and associated materials as well as non-electric engines and motors. Canada has lost its comparative advantage in automatic data processing machines as well as aircrafts and associated equipment.

According to a study by Balassa [1977], the situation was quite different in previous decades. Indeed, Canada held the second place in so-called "research intensive" products during the period 1953-71, far ahead of European countries and Japan. Balassa explains the Canadian case by its high integration with the United States which was, at the time, world leader in technology innovation. However, the

Table 9

Canada's comparative advantages in the high technology sector

(Per cent)

		Ratio	
		1971-1973	1987-1989
SITC			
523	Other inorganic chemicals; organic and inorganic compounds of precious metals	0.74	0.85
524	Radioactive and associated materials	1.60	2.01
541	Medicinal and pharmaceutical products	0.21	0.19
714	Engines and motors, non-electric (reaction engines, turbo-propellers, gas turbines)	1.59	1.43
716	Rotating electric plant and parts thereof	0.32	0.42
736	Machine-tools for working metals	0.30	0.25
752	Automatic data processing machines and units thereof (including peripheral equipment)	2.43	0.61
761	Television receivers	0.03	0.14
764	Telecommunications equipment	0.95	0.52
771	Electrical power machinery (other than plants under heading 716)	0.32	0.50
773	Equipment for distributing electricity	0.54	0.62
774	Electrical apparatus for medical purposes and radiological apparatus	0.59	0.26
775	Household type, electrical and non-electrical equipment	0.18	0.19
776	Electronic tubes and valves, diodes transistors, microcircuits	0.38	0.43
792	Aircraft and associated equipment	1.08	0.97
871	Optical instruments and apparatus	0.06	0.27
872	Medical instruments and appliances	0.19	0.17
874	Measuring, checking, analyzing and control instruments	0.64	0.57
8811	Photographic apparatus and equipment	0.02	0.09
8822	Photographic films, plates and paper	0.35	0.40
8841	Lenses, prisms, mirrors and other optical elements	0.35	0.17
885	Watches and clocks	0.04	0.02

Canadian position was already showing slippage.

Table 10 shows an international comparison of RCAs for the 1987-89 period. The

Table 10

Comparative advantages, high technology sector, 1987-1989

Ratio

SITC	Products	Canada	USA	Japan	Germany	France	UK	Italy	ACEE	Sweden	EFTA	NIC	Australia/ New-Zealand
523	Other inorganic chemical products		1.65		1.70		1.59		1.06	1.26	1.02		
524	Radioactive materials	2.01	1.54			4.48	3.02						1.02
541	Medical and pharmaceutical products		1.20		1.34	1.64	1.96		1.48	1.78	3.05		
714	Non-electrical motors and equipment	1.43	3.21			1.31	3.69						
716	Rotating electric plant and parts thereof		1.03	1.90	1.41	1.42	1.25	1.16		1.09	1.51	1.30	
736	Machine-tools for working metals			2.25	2.00		0.99	1.96		1.08	2.60		
752	Automatic data processing machines and units thereof (including peripheral equipment)		1.90	2.11			1.65					2.13	
761	Television receivers			1.70	1.07						1.04	4.11	
764	Telecommunications equipment			4.04						1.68		2.24	
771	Electrical power machinery (other than plants under heading 716)			1.86	1.16					1.69	1.68	2.67	
773	Equipment for distributing electricity		1.40	1.15	1.05	1.00			1.05	1.04	1.39	1.26	
774	Electrical apparatus for medical purposes and radiological apparatus		1.27	1.47	2.62	1.10			1.76	1.53			
775	Household type, electrical and non electrical equipment				1.50			3.05		1.42		2.53	
776	Electronic tubes and valves, diodes transistors, microcircuits		1.79	2.46								2.74	

Table 10 (cont.)

SITC	Products	Canada	USA	Japan	Germany	France	UK	Italy	ACEE	Sweden	EFTA	NIC	Australia/ New-Zealand
792	Aircraft and associated equipment		4.10			1.80	2.69						
871	Optical instruments and apparatus		1.39	2.82	1.56		1.26				1.33	1.32	
872	Medical instruments and appliances		2.48	1.48	1.32		1.31		1.11	1.79	1.00		
874	Measuring, checking, analyzing and control instruments		2.12	1.17	1.58	1.13	2.08			1.23	1.72		
8811	Photographic apparatus and equipment			5.01								2.34	
8822	Photographic films, plates and paper		1.40	2.08	1.16	1.15	2.13		1.79				1.03
8841	Lenses, prisms, mirrors and other optical elements		1.19	4.52	1.32							1.01	
885	Watches and clocks			2.01							6.36	3.68	

spread between Canada and other G7 countries is more pronounced in the case of high technology products than in the case of the manufacturing sector in general. While Canada has a comparative advantage for only 2 of the 22 products, Japan has16, the United States 15, Germany 14, the United Kingdom 12 and France 9. Sweden has 11 and newly industrialized countries of Asia have 12. Of all countries or groups analyzed, only Australia and New Zealand are comparable to Canada.

d) Structural changes in comparative advantages

The preceding discussion dealt mainly with changes specific to the group of comparative advantages. An analysis of RCAs can also be enlightening on the capacity of countries to make general changes to comparative advantages over time. The question here is to test globally the structure of comparative advantages between the beginning and the end of the period; the Spearman rank coefficient test allows determining whether the overall rank of commodities as measured by comparative advantages varied substantially over the last 20 years.

Table 11 clearly confirms that the comparative advantages structure has remained practically unchanged over the last 15 years. The high level of correlation means that the ranking of commodities on the basis of comparative advantage has remained essentially the same. However, this does not exclude the fact that there have been some additions or losses in the group of comparative advantages as previously noted.

Canada and the United States, together with Italy and Sweden, belong to a group of countries where the structure of comparative advantages has changed the least. On the other hand, France and newly industrialized countries of Asia have recorded the highest rate of change in the structure of their exports. Japan and Germany fit between those two groups. It is interesting to highlight the Japanese case where, while substantial changes in the ranking of exports did not take place, there was a concentration on high technology products for which demand is strong.

4 Analysis of Constant Market Shares

The analysis has identified, to date, some factors specific to the Canadian trade performance. Exports are concentrated on the American market and are, in general, made up of a higher proportion of resource-based goods for which the share of world exports has decreased in recent years. We will attempt here to determine the extent to which these factors may have influenced changes in our share of world markets.

Table 11

Spearman Coefficient Between 1971-73 and 1987-89

	Coefficient
Italy	0.919
USA	0.893
Sweden	0.888
Canada	0.885
Australia, New Zealand	0.865
U.K.	0.847
Japan	0.844
Germany	0.843
EFTA	0.814
OEEC	0.797
NICs-Asia	0.744
France	0.743

The constant market share method allows the application of a systematic approach to the analysis of market share fluctuations between two periods. This method is quite simple and rests on the governing principle that growth in national exports is compared with that of world exports and that any deviation from this standard can be broken down into a product composition effect, a market distribution effect and a so-called ability to compete effect.

Thus, a country may have lost its share of world markets because its exports are concentrated in goods for which demand grew more slowly than for world trade. It may also be that exports go to geographic markets relatively more stagnant than the world average. The third effect is described as ability to compete since it refers to a country's ability to maintain market share after demand factors have been taken into account.

It should be stressed that market share analysis is essentially a statistical tool allowing identification of the source of market share changes. The model for market shares is as follows:

$$(3)\ \sum_{i}^{n}(X_i^{t2} - X_i^{t1}) = r\sum_{i}^{n} X_i^{t1} + \sum_{i}^{n}(r_i - r)\,X_i^{t1} + \sum_{i}^{n}\sum_{j}^{n}(r_{ij} - r_i)\,X_{ij}^{t1}$$
$$+ \sum_{i}^{n}\sum_{j}^{n}(X_{ij}^{t2} - X_{ij}^{t1} - r_{ij}X_{ij}^{t1})$$

where:

x	=	national exports
i, j	=	geographic products and markets
t1, t2	=	beginning and end period
r	=	rate of increase of world trade between t1 and t2
r_i	=	rate of increase of world trade of product (i) between t1 and t2
r_{ij}	=	rate of increase of world exports of product (i) to geographic market (j) between t1 and t2.

The term on the left of the identity denotes actual variations in national exports between periods t1 and t2. The first term to the right indicates that part of export growth which is attributable to the general increase in world exports.

The second term to the right measures the impact of product composition. It corresponds to the sum of exports weighted by the difference between the observed rate of export increase for the product in question and that of world exports. A minus sign indicates that the country concentrated its exports in a range of products the demand for which increased at a rate lower than for world trade.

The third term refers to the market distribution effect. This expression takes into account the distribution of a product to various geographical markets. It corresponds to the sum of each product exported and each market weighted by the difference between the rate of growth of national exports of this product to a given market and the rate of growth of world exports for the product in question. A minus sign indicates that national exports are sent to markets where the rate of growth is lower than the rate of growth of world exports for the product in question. In other words, exports are sent to markets that do not perform as well as the world average.

The last term of the expression is defined as the difference between the growth of national exports and those which would have occurred if the share of national exports of each product to each market had been sustained between the two periods. This residual term is related to the capacity of sustaining competition since it outlines national exports performance of a given product on a foreign market in relation to the overall performance of all exporters on said market.

A minus sign is then interpreted as a loss of ability to compete since it indicates that the country has, in general, had a rate of export increases lower than its competitors on the same foreign markets. The capacity of sustaining competition is linked to the change in domestic supply conditions in relation to those of other countries.

The market share method obviously has its own limitations. In the first place, the model is a statistical identity which decomposes past export changes; it provides no explanation of future perspectives. This statistical approach is useful mainly to

identify the sources of variations. Secondly, the standard has a significant impact on calculations and its selection is arbitrary. In our case, however, the growth of world exports appears to be a reasonable standard.

Thirdly, the fact that the ability to compete is determined in a residual fashion raises concerns as to the precise interpretation of this factor. There obviously is a solid theoretical base to the effect that the difference between observed export growth and that which is derived from the standard calculated from the constant market share could be attributable to price fluctuations.[20]

However, a negative residual can be related to several phenomena. In addition to an increase in domestic cost of production, the effect of global competition also includes fluctuations in exchange rates, international differences in quality and the creation of new products, differences in marketing and export financing and the capacity to fill foreign orders within a reasonable period of time.

A negative residual can also result from gains in market share inevitably made by newly industrialized countries with lower costs. This phenomenon is not a problem in itself since it is a normal component of the growth of developing countries. The sum of world shares being equal to one, it follows that the coming of new exporters will decrease the world market share of existing countries.

This decrease does not automatically mean that trade performance should be a source of concern. One must first determine the causes of this decline; there is justification for concern to the extent that it reflects national deficiencies, specifically inadequate productivity performance.

Table 12 shows the results of this analysis for major countries or groups of countries. To minimize the impact of short-term fluctuations, we used an average starting period of 1971-73 and an average ending period of 1987-89. The influence of each factor is expressed as a proportion of the total variation observed between the two periods.

In summary, a world growth factor higher than 100 implies that world exports increased at a rate faster than national exports over the period 1971-89. With respect to the other factors, a minus sign indicates that this factor contributed to a decrease in market share.

As could be expected, Canada's case demonstrates that exports increased at a slower pace than world trade. A loss of its ability to compete as well as, to a lesser extent, an unfavourable composition of exports explain the decrease of Canada's share of world exports. The market effect, for its part, made a positive contribution to the growth of exports.

It should be noted that most G7 countries have suffered a deterioration in their

Table 12

Decomposition of changes in world market shares 1971-73, 1987-89
Some countries or groups of countries
(Per Cent)

Country	World growth	Composition effect	Market effect	Ability to compete effect	Total
Canada	122.29	–5.28	13.65	–30.66	100.00
United States	111.57	1.96	0.75	–14.28	100.00
Japan	68.54	9.86	20.64	0.96	100.00
Germany	101.48	12.73	–3.49	–10.72	100.00
France	106.03	3.04	–2.95	–6.12	100.00
United Kingdom	104.49	10.82	–5.85	–9.46	100.00
Italy	84.80	12.71	–5.28	7.78	100.00
Others EEC	102.67	1.55	–4.13	–0.09	100.00
Sweden	131.41	4.07	–2.32	–33.15	100.00
EFTA	87.96	4.66	–5.35	12.73	100.00
NICs/Asia	26.90	5.78	11.52	55.79	100.00
Aust-NZ	148.87	–54.73	4.84	1.02	100.00

ability to compete and this suggests that this is a global phenomenon linked to the presence of new low-cost exporters such a Pacific Rim countries and China. However, the size of the Canadian drop is significantly higher than that of other major industrialized countries and this points to domestic factors that eroded Canada's cost position. A detailed analysis of the breakdown of the loss of the ability to compete effect indicates that it is present across various categories of products, even if it is largely concentrated in the machinery and transport manufacturing sector.

This evidence is also corroborated by an analysis of the evolution Canada's cost performance over the last few years.[21] The authors noted that Canada's cost position deteriorated mainly in relation to the United States, our major trading partner. Average costs of manufacturing in Canada were 36 percent higher than costs in the United States in 1990; in 1980, the spread was only 6 percent. A slow down in productivity increases and a more rapid progression of hourly wage rates explains almost completely the widening gap between 1980 and 1990. By contrast, Canada's position for unit labour costs improved in relation to West Germany, Japan, Taiwan and South Korea during the 80s as a result of the appreciation of their currencies with respect to the Canadian dollar.

The second cause of this decrease in the market share relates to the structure of Canadian exports. The explanation rests on the high concentration of primary mate-

rials in Canadian exports while these products grew less than the world trade average. Finally, we should note that the concentration of Canadian exports to the American market, where growth was strong during the 80s, slowed down the Canadian loss of world market share.

With respect to other G7 countries, only Japan and Italy had higher than world average growth. These two countries seem to have benefited from an advantageous structure of exports as well as a favourable cost position but only Japan recorded an improvement related to the market distribution effect as a result of its strong presence on the Asia/Pacific market and its penetration of the North American market.

In the case of the Unites States, the decrease in market share is essentially related to a loss of competitiveness; other factors have had little impact. France, the United Kingdom and Germany registered a decrease in market share explained specifically by unfavourable cost position and market distribution. While it has multiple causes, the superior performance of NIC-Asia is mainly attributable to their favourable cost position.

It is also interesting to compare the Canadian performance with that of other resource producers such as Sweden, Australia and New Zealand. These countries registered a loss of market share, just like Canada, but to a much greater degree. In the case of Sweden, this loss is due mainly to a deterioration of its competitiveness and, to a lesser degree, to a concentration on less performing markets. As for Australia and New Zealand, their high concentration in the raw materials sector played against them. The small increase in their ability to compete results from a depreciation of their currency in the second half of the last decade.

5 Conclusion

The analysis of Canada's performance revealed that Canada is specialised in resource-based products, a low growth sector, and that this specialisation has changed little over the last 20 years. Other major industrialized countries have a comparative advantage structure which is more closely aligned with world trading patterns. In other words, Canada has not been able to benefit from world changes because it was not able to find new market niches and gain comparative advantages in high growth sectors.

Based on the constant market share analysis, we have also found that the decrease in Canada's world market share is in large part due to a loss of our competitive edge. While this methodology does not yield a final conclusion on the issue, it should be noted that the size of the loss of Canada's ability to compete effect is significantly larger than for other major industrialized countries, thus pointing to particular problems. Since the deterioration of Canada's economic performance with

respect to costs is analyzed in depth in another study (Rao and Lemprière 1992), we will limit our discussion here to Canada's international specialisation and its impact on the future progression of living standards.

In a certain sense, one should not be overly surprised by this stagnation of our specialisation since Canada has achieved its high level of prosperity by developing its natural resources. Jobs in these industries are well paid and many people rely on them in remote areas. In addition, the comparative advantages theory states that countries must specialize in the production of goods for which inputs are abundant.

In the introduction we mentioned that the analysis of trade performance takes on its full meaning only by reference to productivity and thus Canadian living standards. We have good reasons to believe that this present reliance of Canadian exports on natural resources may have a negative impact on the growth of real incomes of Canadians.[22]

Firstly, the share of resource-based products in world trade has decreased. This is due to the fact that, as world incomes rise, the demand for resource products increases at a slower pace than demand for other products. Moreover, the quickening pace of technological innovations has led to the substitution of synthetic for resource-based products. Producers are thus forced to find new markets or develop new products.

A second important and related factor is the decrease in prices of resource-based products over the last twenty years (Figure 2). Should this trend persist, Canada's comparative advantage will be confined to products that, on average and over time, it will be able to sell for progressively smaller amounts of the products it buys on world markets.

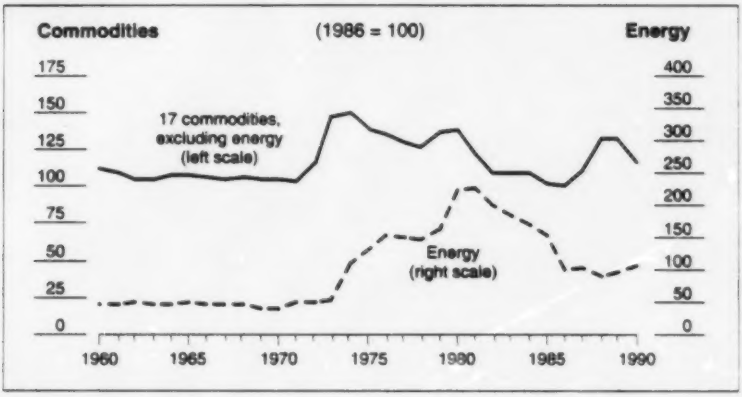
Thirdly, total factor productivity in the primary and resource manufacturing industries advanced, on average, at a much slower rate than in other manufacturing industries, particularly in the high technology sector (Figure 3). Given the relative decline in prices of natural resources, this weaker improvement in productivity will lead, over time, to a slower rate of increase of salaries and profits in resource-based industries than in other industries. These changes, in turn, could result in lower employment in those industries, accentuating thus the adjustment problems, particularly in rural communities and single industry towns.

Finally, the increasing sensitivity to environmental issues implies that extracting industries will have to make new investments not only to increase their productivity and lower their costs but also to comply with environmental protection standards. These additional requirements could play against Canada in relation to other countries specializing in economic activities less likely to damage the environment.

Recent trends in world trade increase the pressure on Canadian industries, par-

Figure 2

Change in real commodity prices,[1] Canada, 1960-90

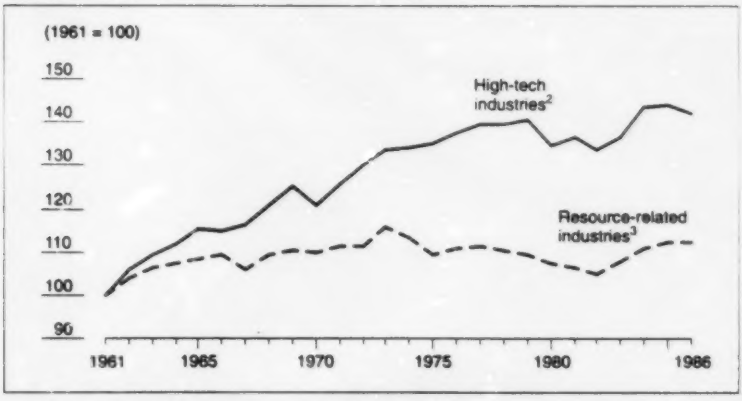


1 Commodity export prices relative to U.S. wholesale price index for finished goods; the commodities include five grains, seven metals, two nonmetallic minerals, three forestry products, and three energy products.

SOURCE Estimates by the Economic Council.

Figure 3

Change in productivity,[1] Canada, 1961-86



1 Measured as production efficiency or total factor productivity.

2 The high-tech industries include transportation equipment, electrical products, and machinery.

3 The resource-related industries include the agriculture, fishing, forestry, mining, food, beverages and tobacco, paper and publishing, lumber and furniture, petroleum refining, nonmetallic mineral products, and primary metal products industries.

SOURCE Estimates by the Economic Council.

ticularly those in the natural resources sector, to increase their productivity. In this regard, a recent study also observes that few resource industries have improved or increased their source of advantages.[23] We believe that natural-resources-based industries must be encouraged to undertake high productivity activities. In all sectors, business must constantly innovate to better position itself on world markets.

Moreover, new areas of specialization must be developed. Skills and technology being also important elements of production, the need for a dynamic and constantly evolving comparative advantage is a real imperative.

Appendices

A – Standard International Trade Classification Rev. 2

	Section Headings	Section Codes
0-	**Food and live animals chiefly for food**	
	Live animals chiefly for food	00
	Meat and meat preparations	01
	Dairy products and birds' eggs	02
	Fish, crustaceans and mollusc, and preparations thereof	03
	Cereals and cereal preparations	04
	Vegetables and fruits	05
	Sugar, sugar preparations and honey	06
	Coffee, tea, cocoa. spices, and manufactures thereof	07
	Feeding stuff for animals (not including unmilled cereals)	08
	Miscellaneous edible products and preparations	09
1-	**BEVERAGES AND TOBACCO**	
	Beverages	11
	Tobacco and tobacco manufactures	12

	Section Headings	Section Codes
2-	**Crude materials, inedible, except fuels**	
	Hides, skins and furskins, raw	21
	Oil seeds and oleaginous fruit	22
	Crude rubber (including synthetic and reclaimed)	23
	Cork and wood	24
	Pulp and waste paper	25
	Textile fibres (other than wool tops) and their wastes (not manufactured into yarn or fabric)	26
	Crude fertilizers and crude minerals (excluding coal, petroleum and precious stones)	27
	Metalliferous ores and metal scrap	28
	Crude animal and vegetable materials, n.e.s.	29
3-	**Mineral fuels, lubricants and related materials**	
	Coal, coke and briquettes	32
	Petroleum, petroleum products and related materials	33
	Gas, natural and manufactured	34
	Electrical current	35

	Section Headings	Section Codes
4-	**Animal and vegetable oils, fats and waxes**	
	Animal oils and fats	41
	Fixed vegetable oils and fats	42
	Animal and vegetable oils and fats, processed, and waxes of animal or vegetable origin	43
5-	**Chemicals and related products, n.e.s.**	
	Organic chemicals	51
	Inorganic chemicals	52
	Dying, tanning and colouring materials	53
	Medicinal and pharmaceutical products	54
	Essential oils and perfume materials; toilet, polishing and cleansing preparations	55
	Fertilizers, manufactured	56
	Artificial resins and plastic materials, and cellulose esters and ethers	58
	Chemical materials and products, n.e.s.	59
6-	**Manufactured goods classified chiefly by material**	
	Leather, leather manufactures, n.e.s. and dressed furskins	61
	Rubber manufactures, n.e.s.	62
	Cork and wood manufactures (excluding furniture)	63
	Paper, paperboard, and articles of paper pulp, of paper or of paperboard	64

	Section Headings	Section Codes
	Textile yarn, fabrics, made-up articles, n.e.s., and related products	65
	Non-metallic mineral manufactures, n.e.s.	66
	Iron and steel	67
	Non-ferrous metals	68
	Manufactures of metal, n.e.s.	69
7-	**Machinery and transport equipment**	
	Power generating machinery and equipment	71
	Machinery specialized for particular industries	72
	Metalworking machinery	73
	General industrial machinery and equipment, n.e.s. and machine parts, n.e.s.	74
	Office machines and automatic data processing equipment	75
	Telecommunications and sound recording and reproducing apparatus and equipment	76
	Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof (including non-electrical counterparts, n.e.s., of electrical household type equipment)	77
	Road vehicles (including air cushion vehicles)	78
	Other transport equipment	79

	Section Headings	Section Codes
8-	**Miscellaneous manufactured articles**	
	Sanitary, plumbing, heating and lighting fixtures and fittings, n.e.s.	81
	Furniture and parts thereof	82
	Travel goods, handbags and similar containers	83
	Articles of apparel and clothing accessories	84
	Footwear	85
	Professional, scientific and controlling instruments and apparatus, n.e.s.;	87
	Photographic apparatus, equipment and supplies and optical goods, n.e.s.; watches and clocks	88
	Miscellaneous manufactured articles, n.e.s.	89
9-	**Commodities and transactions not classified elsewhere in the SITC**	90

B – Countries or groups of countries under study

Canada

United States

Japan

Federal Republic of Germany

United Kingdom

Italy

Other EEC countries:

Belgium – Luxembourg
Denmark
Ireland
Netherlands
EEC countries n.e.m.
Greece
Spain
Portugal

Sweden

European Free-Trade Agreement:

Austria
Finland
Iceland
Norway
Switzerland
EFTA countries n.e.m.

Newly Industrialized Countries of Asia

Republic of Korea
Hongkong
Taiwan
Singapore

Australia and New Zealand

Notes

1 The major results of our research are included in the Economic Council of Canada Statement entitled *Pulling Together, Productivity, Innovation, and Trade.*

2 A complete theory capable of satisfactorily explaining international trade does not seem to exist. The consensus is that trade of resource-based products follows the competitive model while trade of manufactured goods, influenced by intra-industrial exchanges, is more closely aligned with the industrial organization model. See Markusen [1992].

3 For more information on adjustments made, see Statistics Canada [1989].

4 1989 data is preliminary.

5 The two digit Standard International Trade Classification is shown in Appendix A while the group of countries under study is available in Appendix B.

6 This region includes Japan, Hong Kong, Singapore, South Korea, Taiwan, Malaysia, Thailand, Indonesia, the Philippines, China, Australia and New Zealand.

7 The price index, adjusted for inflation, of 33 basic products (excluding energy) which was 104.8 in 1980 amounted to 58.4 in 1991. Source: World Bank, *Price Prospects for Major Primary Commodities 1990-2005,* Third Quarter 1991.

8 For a detailed analysis of developments in newly industrialized countries of Asia, see Rao [1992].

9 The last year for which data from Statistics Canada's World Trade Database is available is 1989. We have more recent data on bilateral trade but these are numbers related to the balance of payments. While these two groups of data are not completely comparable, it seems that the trends mentioned here continued during the last two years when the share of exports to the United States went from 74.5 percent in 1989 to 76.0 percent in 1991.

10 These countries are those of the Asia/Pacific region minus Japan, Australia and New Zealand.

11 G4 refers to Germany, France, the United Kingdom and Italy.

12 The Other Countries category includes also other EEC and EFTA countries.

13 Data for West Germany in 1989 include an unusual percentage of unclassified products. According to Statistics Canada, this should be corrected with the publication of revised data.

14 See Deardoff [1984].

15 See Balassa B., M. Noland, [1988], p. 193.

16 Because of safeguard measures ensuring production in Canada, trade in these products between Canada and the United States does not react only to market conditions. Canada's comparative advantage in this sector should therefore not be interpreted as directly as the advantage of Japan, Germany and of other major producers.

17 Natural gas exports are regulated by the National Energy Board.

18 The first 20 products are, in most cases, an important part of national exports.

19 Since this situation has already been the subject of a previous study, we only update the main results. For more details, see Magun S. and S. Rao, [1989].

20 See Learner E.E., Stern R.M., [1970], chapter 7.

21 See S. Rao and T. Lemprière, [1992].

22 We include in this discussion elements from other studies in the project.

23 See Porter [1991] p. 38.

List of Figures and Tables

Figures

1 Intra-regional trade, 1971 and 1989

2 Change in real commodity prices, Canada, 1960-90

3 Changes in productivity, Canada, 1961-86

Tables

1 World exports: major trading blocks

2 World trade market share, some countries or groups of countries

3 World trade market shares by SITC level

4 Geographic distribution of exports G7

5 Composition of G7 national exports

6 Distribution of Canadian exports by product and destination

7 Canadian exports specialization by revealed comparative advantage, products for which Canada had a comparative advantage in 1987-89

8 Revealed comparative advantages, industrialized countries, exports based index, 1971-73 and 1987-89

9 Canada's comparative advantages in the high technology sector

10 Comparative advantages, high technology sector, 1987-89

11 Spearman coefficient between 1971-73 and 1987-89

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